

Remarks

Claims 1-36 are pending in this application. In a final Office Action dated October 22, 2004, the Examiner rejected claims 24-32 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,751,715 to Chan *et al.* (henceforth, Chan) in view of U.S. Patent No. 5,619,497 to Gallagher *et al.* (henceforth, Gallagher). The Examiner rejected claims 1-8, 10, 12-20 and 23 under 35 U.S.C. § 103(a) as being unpatentable over Chan in view of Gallagher and U.S. Patent No. 6,614,796 to Black *et al.* (henceforth, Black). The Examiner indicated claims 9, 11, 21 and 22 contained allowable subject matter but were objected to as depending upon a rejected base claim. The Examiner allowed claims 33-36. Applicants respectfully disagree with these rejections and request reconsideration in light of the following arguments.

The '103 Rejections

Claim 24 provides a hub interconnecting a plurality of nodes each having a channel over which data is transmitted and received. The hub includes a port interface in communication with each node through the channel. Each port sends data over a send path and receives data over a receive path. An interconnect device forwards data between any send data path and any receive data path. A controller signals the interconnect device to form a plurality of separate communication loops. *Each separate communication loop includes only requesting nodes and nodes responding to the requesting nodes.*

The Examiner rejected claim 24 as an obvious combination of Chan and Gallagher. According to M.P.E.P. § 2142, three criteria must be met for the Examiner to establish a *prima facie* case of obviousness. First, there must be some suggestion or motivation, either in Chan, Gallagher, or in knowledge generally available to one of ordinary skill in the art, to modify Chan. Second, there must be a reasonable expectation that this modification will succeed. Finally, either Chan or Gallagher must teach or suggest all claim limitations. Without reaching the issue of motivation or reasonable expectation of success, the Examiner has failed to find any teaching or suggestion in any reference cited for a controller signaling an interconnect device *to form separate loops each having only requesting nodes and nodes responding to these requesting nodes.*

The Examiner's basis for rejecting claim 24 appears in the final Office Action on pages 5-6. Nowhere in this discussion does the Examiner even mention Applicants' limitation that the interconnect device forms separate communication loops, *each separate communication loop including only requesting nodes and nodes responding to the requesting nodes*. It is axiomatic that a *prima facie* case of obviousness cannot be established without at least mentioning each claim limitation and providing some indication as to how that limitation is met. The Examiner has failed to establish a *prima facie* case of obviousness for claim 24 by not even considering each claim limitation. Claims 25-27 depend from claim 24 and are therefore also patentable.

Independent claim 28 provides a method of interconnecting a plurality of nodes. A main communication loop is formed interconnecting the plurality of nodes. A request is received from a first node to access a second node. A determination is made as to whether or not the second node is busy. If the second node is not busy, a separate communication loop is formed having only the first node and the second node. The separate communication loop is formed to leave the plurality of nodes not including the first node and the second node interconnected by the main communication loop.

The Examiner rejected claim 28 by simply stating it was a "method claim corresponding to" claim 24 and was therefore "analyzed and rejected as previously discussed" for claim 24. Even a casual read of claims 24 and 28 indicates that one is not simply a method version of the other. The Examiner has not carried *his burden* of establishing a *prima facie* case.

Neither Chan nor Gallagher teach or fairly suggest Applicants' invention. Chan discloses forming subloops, each with a plurality of devices (See, for example, Figures 8a, 12-14 and 16-28.) The only discussion of any kind in Gallagher related to loops indicates Gallagher implements a standard Fibre Channel multiport loop. (See, col. 20, ll. 17-39.)

Claim 28 is patentable over any combination of Chan and Gallagher. Claims 29-32, which depend from claim 28, are therefore also patentable.

Independent claim 13 provides a switching hub for use in a network having a plurality of nodes each connected to the switching hub by a sending channel and a receiving channel, each node sending at least one connection message. The switching hub includes an interconnect switch for connecting the sending channel and the receiving channel of each node

into at least one separate communication loop. The switching hub also includes a plurality of port interfaces each linking the respective receiving channel and the respective sending channel of each node to the interconnect switch. Each port interface detects messages on the receiving channel. A controller forms a plurality of separate communication loops, each based on at least one detected message. *Each separate communication loop consists only of at least one requesting node and at least one node responding to the at least one requesting node.*

The Examiner rejected claim 13 as an obvious combination of Chan, Gallagher and Black. The Examiner's support appears on pages 7-8 (also referring to paragraph 3, which is addressed below). Pages 7-8 do not mention any teaching in any reference for a controller forming separate communication loops *each consisting only of at least one requesting node and at least one node responding to the at least one requesting node.*

As described above, neither Chan nor Gallagher teach or fairly suggest separate communication loops having only requesting and responding nodes. Black discloses a switch for interconnecting standard FC-AL loops. Black neither teaches nor suggests Applicants' separate communication loops.

Claim 13 is patentable over any combination of Chan, Gallagher or Black. Claims 14-23, which depend from claim 13, are therefore also patentable.

Independent claim 1 provides a method for controlling a plurality of message transfer operations between a plurality of nodes. A request from a first node to switch the first node to a separate communication loop is detected, the separate communication loop containing *only the first node*. The first node is switched to the separate communication loop. A request from the first node to open message transfer operation between the first node and a second node is detected. The second node *is switched to the separate communication loop* when the second node is not busy.

The Examiner rejected claim 1 for the same basis as claim 13 was rejected. While Applicants do not agree that claim 1 has the same scope as claim 13, claim 1 is patentable for the same reason that claim 13 is patentable. Claims 14-23 depend from claim 13 and are therefore also patentable.

The Examiner's Argument on "Separate Loops"

Paragraph 3 of the final Office Action appears to be an attempt by the Examiner to rebut Applicants' argument that Chen does not disclose "forming a separate loop containing only those nodes necessary to support the requested communication." The Examiner begins by apparently admitting that Applicants are correct at page 2 as follows (emphasis in the original):

Applicant's argument with respect to the rejected claim 1 [is] that the cited references do not each or suggest the "*forming a separate loop containing only those nodes necessary to support the requested communication*". However, Chan et al. (US#5,751,715) is applied herein merely for the teaching of the accelerated Fiber Channel protocol handshaking and data exchange involves dividing a Fiber Channel arbitrated loop architecture up into a plurality of arbitrated subloops.

If Chan "is applied merely for the teaching" of a plurality of arbitrated subloops, which reference actually discloses Applicants' separate loops? The Examiner does not say.

The Examiner next refers to Chan's Figure 5, which is a "prior art" representation of "a protocol flow of a typical "Fibre Channel local area network." (Col. 5, ll. 25-27.) As is well known in the art, Fibre Channel arbitrated loops of this kind include many devices interconnected in a ring. This ring is discovered upon initialization and, barring failure of a device or insertion or removal of a device, is not changed. There is no possibility of forming separate communication loops as provided in Applicants' invention. The Examiner states that "a source node and a destination node can acquire the loop for their exclusive use in a data transfer operation." This may be true, but this is not forming a *separate loop*. The other devices are still in the loop.

The Examiner's next attempt appears to be that Chan's Figure 8a discloses Applicants' separate loops. Figure 8a is described in Chan at col. 7, ln. 32-col. 8, ln. 3, reproduced as follows;

Referring to FIG. 8, there is shown a block diagram of an improved accelerated Arbitrated Loop Fibre Channel protocol network. The network has been broken down into four subloops in accordance with the teachings of the invention. Subloop "A" is comprised of three nodes designated A1, A2 and A3. Each one of these nodes can be a unit such as a disk drive, server, etc. Likewise, the three other subloops have three nodes also. For

example subloop "B" has nodes B1, B2 and B3 and likewise for subloops "C" and "D". Each of these subloops is coupled to a hub port. The four hub ports are labeled A, B, C and D and are coupled to the subloop having the same letter designation.

The function of these hub ports is to implement an accelerated protocol for operating the Fibre Channel protocol network. This accelerated protocol is consistent with the Fibre Channel protocol in that all the same commands and primitives are used for purposes of arbitration to take control of the network and setting up and closing data transfer connections. However, the accelerated protocol implemented by the structure of FIG. 8 is improved in that each data transfer from a source node to a destination node is implemented through switching in the hub ports such that many of the nodes in the network which would otherwise be involved in the transfer in a prior art Fibre Channel network are essentially "cut out of the loop". Since each node that a data frame passes through in a Fibre Channel network imposes a six word delay (called a latency time) with each word being forty bits long, each node that is cut out of the loop in a data transfer with the accelerated protocol results in a saving in overall loop latency time. This means that the data in a transfer operation arrives at the destination sooner and the destination can send back a CLS (close) or RRDY (ready to send data) command sooner to request more data or close the connection. By virtue of the data transfer happening more quickly, the Fibre Channel network is released more quickly for another data transfer transaction. Therefore, the entire I/O transfer rate of the network increases substantially.

Chan discloses placing devices on subloops *a priori*, before any specific requests are known. Only those subloops containing the requestor and the responder are then connected together. There will, however, still be devices on this reduced loop which are neither the requestor nor the responder. Chan neither teaches nor suggests Applicants' invention as claimed.

The Examiner's final attempt appears to be a reference to the FC-AL specification. Again, as well known in the art, this specification calls out a loop containing many devices that is established on initialization and which cannot form separate loops as provided by Applicants' invention.

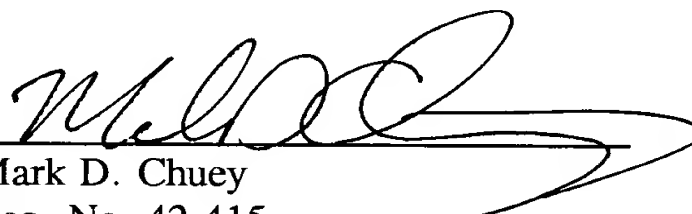
Conclusion

Claims 1-36 are pending in this application. Applicants believe these claims meet all substantive requirements for patentability and respectfully request that the Examiner pass this case to issuance. No fee is believed due by filing this paper. However, any fee due may be withdrawn from Deposit Account No. 19-4545 as specified in the Application Transmittal.

The Examiner is invited to contact the undersigned regarding any aspect of this case.

Respectfully submitted,

EDWARD J. FIORE

By 
Mark D. Chuey
Reg. No. 42,415
Attorney for Applicant

Date: January 13, 2005

BROOKS KUSHMAN P.C.
1000 Town Center, 22nd Floor
Southfield, MI 48075-1238
Phone: 248-358-4400
Fax: 248-358-3351